IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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PATENT

In re application of: Larson et al.

Application No.: 10/685,739

Filed: October 14, 2003

Title: UNIFORM ETCH SYSTEM

Attorney Docket No.: LAM1P167X2/01066X

Examiner: ZERVIGON, Rudy.

Group: 1763

Confirmation No.: 6129

DECLARATION UNDER 37 CFR § 1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Dean Larson, declare as follows:

I am a co-inventor in the above-identified patent application.

I am a citizen of the United States of America.

I received a BA degree from California Polytechnic State University, San Luis Obispo.

I have worked for Lam Research Corporation from 1996 performing mechanical design and analysis of structural, thermal, materials, fluid and gas flow, and vacuum technology on semiconductor industry wafer dry etch and transport systems. I previously worked for Lockheed Missiles and Space from 1983 to 1996, providing the same services.

I have reviewed the patent US. Patent No. 5,496,408 to Motoda et al (Motoda), US Patent No. 6,315,858 to Shinozuka et al. (Shinozuka), and US Patent No. 5,313,982 to Ohmi et al. (Ohmi).

Our invention provides an apparatus for providing gas from a gas supply to at least two different zones in a process chamber that has a flow divider to divide gas to a plurality of legs. A master leg is connected to the flow divider and has a master fixed orifice. A slave leg is connected to the flow divider and has a slave leg valve and a first slave fixed orifice.

In my area of work the phrase, "fixed orifice" is a term of art referring to a fixed flat plate body, containing a precision fixed geometry aperture, mounted within a tubing system. An example of such a device is described in figure 3G-36 on page 407 in the SAE Aerospace Applied Thermodynamics Manual.

None of the cited references teaches or discloses a "fixed orifice" used in the claimed gas distribution system.

The pipe of Motoda is not inherently a fixed orifice because its geometry more closely resembles a tube restrictor, which is characterized by a different set of mathematical equations for defining flow. Because a tube restrictor is characterized by a different set of mathematical properties and therefore has different characteristics than a fixed orifice, I do not consider a tube restrictor to be a fixed orifice.

The movable iris of Shinozuka is not a "fixed orifice" because of its motor driven ability to change its aperture size. In addition, it would not be obvious to use such a movable iris in the apparatus of Motoda because such movable parts causing plates to rub against each other would introduce particle contaminants that would damage the wafer substrate surface in a wafer dry etch process of small feature sizes.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both (under Section 1001 of Title 18 of the United States Code), and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dean Larson

Dean Larson

1/10/06

Date